THE INFLUENCE OF LEARNING STYLES ON KNOWLEDGE ACQUISITION IN PUBLIC SECTOR MANAGEMENT

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Abstract

This research note outlines a project designed to investigate the role of training institutions in providing effective training and development programmes for managers. The investigation is being carried out in the light of recent criticisms levelled against the nature of formal learning environments prevalent in most institutional settings. The traditional role of trainers and developers as the providers of knowledge and skills for the development of competent managers runs contrary to recent findings, which suggest that managers learn more effectively in informal settings, rather than the formal settings evident in many development programmes. The idea that explicitly extracted competencies are the target every manager should aim for to improve their effectiveness is also challenged because competencies alone are no longer regarded as a sufficient criterion for success. Recent research has attached greater importance to the need for helping managers to see knowledge as a social phenomenon, and one factor that might distinguish successful managers from others is tacit knowledge (Wagner & Sternberg, 1987; Argyris, 1999). A major focus of this study is to explore the possibility that the level and content of tacit knowledge acquired by managers may be influenced by their individual learning styles, and the degree to which their dominant styles are matched with the context of their work environment.

Introduction

Despite the huge investments made by organizations to equip their managers with the necessary knowledge and skills to be efficient and successful, it is often seen as more of an "act of faith" because the actual results are not easy to measure. There is a body of literature which suggests that most of what managers actually learn is "on the job" and they do it through their own experience. Examples include the theory of situated learning (Lave & Wenger, 1991), which emphasises the interaction between individual learning, practice and every-day work tasks, and the theory of communities of practice (Brown & Duguid, 1992; Wenger, 1999) which stresses the term community and social relationships around the learner. Drawing on Polanyi's (1966) distinction between explicit and tacit knowledge, the latter is often regarded as being the most valuable for a successful managerial career (Wenger, McDermott & Snyder, 2002). Literature also reveals that the content and level of tacit knowledge differs between the typical and the more successful managers. It follows, therefore, that if tacit knowledge is acquired by learning from experience, then management education and development providers need to reassess their role from being a provider of skills and theory to being a facilitator in the acquisition of relevant tacit knowledge.

In order to enhance our understanding of the processes involved, the proposed study explores the possibility that learning styles may play a significant role in determining the level of managerial tacit knowledge acquired, as managers interact with their local work environments. The broad thesis of the study is that the level of tacit knowledge acquired by public sector managers is influenced by both their individual learning styles, and the degree to which their dominant preferred learning styles are matched with the context of their work environment.

A mixed-method methodology is being adopted in order to investigate the relationship between learning styles and the level of tacit knowledge acquired by managers in three content areas of the public sector. For the quantitative element of the study, Wagner & Stenberg's (1985) Tacit Knowledge Inventory for Managers and Kolb's (1999) learning styles inventory are used. The study is expected to make two contributions. Firstly, to enhance our understanding of the significance of learning styles to the development of managers, and secondly, to inform management trainers of ways in which they need to shift their role from knowledge providers to facilitators of management learning.

Management Education and Development

Organizations have made huge investments in a variety of management education and development initiatives. Many have set up special departments, whilst the larger organizations have even invested in their own training and development institutions. Increasing demand for training and development has made the field appealing to the private enterprise, and training and development has almost become an industry in its own right (Margerison, 1984). Because the principles behind most business endeavours are profit and cost-effectiveness, education and training is now often treated as a form of commodity, much the same as the production of goods. This often results in a mindset which is geared towards catering for the masses, relying on traditional and established modes of product delivery through formal training programmes, when newer approaches designed to attend to individual needs is often called for (Argyris & Schön, 1974).

There are two ways in which management development are viewed. One perspective is that management development exists within the broader context of management learning, and that also includes management education (Burgoyne & Reynolds, 1997). Within this perspective, learning provided by educational institutions is usually associated with the term education, whereas learning within work organizations is associated with the term training and development. An alternative perspective is to view management development as the overarching field, covering both the education and training aspects (Mumford, 1993). Within this perspective, Peel (1984) differentiates management education from training by suggesting that management education usually involves courses that are of a longer duration than training courses. Despite these differences, both perspectives share a similar view in distinguishing between the two aspects of education and training/development. This paper adopts the term management education when referring to learning provided by academic institutions striving to enhance managers' analytical and critical skills. The term management development is adopted when referring to learning that takes place within work organizations. The term management learning is adopted to refer to all forms of management education, development and training.

The traditional approach of developing and educating managers by providing formal learning in organized, time-bounded and structured learning programmes is often the preferred approach (Fox, 1997). However, many have questioned the validity and effectiveness of these types of formal learning programmes for developing and educating managers and it has been claimed that these approaches are flawed because they do not take individual differences into consideration (Argyris & Schön, 1974). Consequently, behaviour changes resulting from attendance on such courses do not last (Fleishman, 1953 cited in Burgoyne & Reynolds, 1997). Industrialists and even educationalists often echo these concerns and demand a more effective approach to the "static form of education, emphasizing memory and repetition" (Margerison, 1984: p.2). Lave and Wenger (1991), who argue in favour of situated learning approaches within communities of practice rather than formal education and training through "schooling" make the following points:

- Schooling produces schooled adults, people who can talk about practice, instead of practitioners of some practice.
- Schooling separates learning from practice.
- Teaching and learning in schooling institutions is carried out by "classroom interaction" rather than learning by practical techniques such as observing and imitating.

They argue that formal "schooling" has endemic problems that can be better understood by contrasting it to informal learning that takes place on the job. Other researchers have also argued that effective management learning does not stem from organized learning providers and programmes (Mumford, 1997; Burgoyne & Hodgson, 1983; Cunningham & Dawes, 1997) and Fox (1997) considers formal management education and development to be just a small part of the learning process. He suggests that "most learning to manage, and managing to learn, occurs 'on-the-job' in tacit, culturally embedded ways through people's work practices within organizations, groups and other communities of practice" (p 35). Mumford (1993) provided empirical evidence of this when he reported the views of managers and executives who considered that they were more likely to associate their significant learning with "informal, not formal, experiences" (p5). Among the terms associated with on-the-job or informal management learning are 'implicit or unconscious learning' (Reber, 1967), 'situated learning' (Lave & Wenger, 1991), and 'experiential learning' (Kolb, 1984). Situated learning gathers a lot of following among those working on team and group learning such as communities of practice. Experiential learning received widespread support for its emphasis on understanding the whole person through their experience thus providing more relevance to daily professional life (Burgoyne & Reynolds, 1997). Implicit learning is viewed as not very helpful due to its limited applicability to real-world situations (Atherton, 2002).

The shift in emphasis from a preference for formal learning environments to informal methods has direct implications for one of the most researched areas in management development: the quest for managerial effectiveness. It is the contention of this study that learning from informal means will result in a form of knowledge that is closely associated with that of experts and successful people. The form of knowledge that distinguishes these highly effective managers from others is often referred to as 'tacit knowledge' (Nestor-Baker & Hoy, 2001; Wagner & Sternberg, 1985; Klemp & McClelland, 1986; Williams, 1991; Tan & Libby, 1997; Murphy & Wright, 1984). Several notable authors have presented arguments which claim that tacit knowledge is an important ingredient for success in both individuals (Argyris, 1999; Wagner & Sternberg, 1985; Nestor-Baker, 1999) and organizations (Baumard, 1999; Lubit, 2001; Hall, 1993; Prahalad & Hamel, 1990). Little is

understood, however, about how this knowledge is actually acquired. Despite the fact that many authors acknowledge experience as the source of tacit knowledge (Polanyi, 1966; Patel et al., 1999; Sternberg & Wagner, 1993; Baumard, 1999; Nonaka, 1994; Hatsopoulos & Hatsopoulos, 1999), the nature of the relationship between tacit knowledge and experience has not been established. Herein lies one of the main research questions associated with the proposed research - is there any difference in the way that successful and effective managers learn from experience compared with those that are less successful?

Tacit Knowledge

Much of our current understanding of the concept of tacit knowledge is owed to the writings of authors such as Simon (1973), Neisser (1976), Schön (1983), Scribner (1986), Wagner & Sternberg (1986), Janik (1988), Reber (1989), Nonaka & Takeuchi (1995), von Krogh & Roos (1995), Baumard (1999), and Collins (2001). Several unique traits were found to characteristically define tacit knowledge. It is knowledge that people do not know they have and/or find difficult to articulate (Forsythe et al., 1998), resisting articulation or introspection (Cooper & Sawaf, 1996; Morgan, 1986). Although tacit knowledge may be considered by some to be a bane to articulation, others consider it to be, to a certain extent, measurable (e.g. Ceci & Liker, 1986; Forsythe et al. 1998; Sternberg & Grigorenko, 2001a). However, by virtue of the fact that this type of knowledge is tacit, it cannot therefore be understood through direct articulation, but must be inferred from actions and statements (Forsythe, et al., 1998).

A common thread within the literature is to attribute the origin of the construct to the science philosopher Micheal Polanyi who describes it in the famous quote "we can know more than we can tell" (1966, p4). Baumard (1999) tracks tacit knowledge further back to the ages of the ancient Greeks in "phronesis" - the practical aspects of knowledge, the result of experience that cannot easily be shared, knowledge that is personal, profound, non-scientific and "generated in the intimacy of lived experience" (pg 53). Works by Neisser on ecological psychology in 1976 and Schön on reflective practice in 1983 (Forsythe et al. 1998) provides a more contemporary perspective on tacit knowledge. Sternberg's works (e.g. Wagner & Sternberg, 1985; Sternberg et al., 1993; Sternberg & Grigorenko, 2001a), however, was credited for shifting the investigation of tacit knowledge out of the laboratory environment into the world of applied social science (Horvath, 1999).

Sternberg and his group of researchers conducted empirical studies from which they were able to make inferences on the nature of tacit knowledge. They concluded that tacit knowledge could be characterized into three main features (Sternberg et al., 2000; Sternberg & Horvath, 1999):

1. Tacit knowledge is acquired with little help from others, implying that tacit knowledge is grounded in personal experience.
2. Tacit knowledge has practical value in use in that it is more instrumental in achieving a person's goal than knowledge based on someone else's experience.
3. Tacit knowledge is procedural (as opposed to declarative) in structure.

An important issue that has been debated in discussions of tacit knowledge is the ability to explicate it. Baumard (1999) views tacit knowledge is inarticulable and argues that if it is explicated or codified, its value as a tacit resource will be lost. Gourlay (2002) in analyzing Polanyi's writings also concluded that there are aspects of tacit knowledge that can never be made explicit. He pointed to Polanyi's argument that even if all other experiences

have been made explicit, the "sensory quality" of an experience will remain inarticulable (Polanyi, 1966: 32). More recently, Collins (2001) grouped tacit knowledge into three different categories in terms of explicability: motor-skills, rules-regress model and "forms of life". He reiterated that both motor-skills and rules-regress model could be captured through advances in neural net computing except for "forms of life" types of tacit knowledge because this involves human socialization that is not possible for computers to simulate. Janik's (1988) position shows that he subscribed to the duality view of tacit knowledge: those that can be expressed and those that can never be expressed. Nonaka (1995) simply holds that tacit knowledge is hard to articulate but did not indicate any form of tacit knowledge that is totally inarticulable, and nor did Sternberg (1985). Indeed, Sternberg (1985) meticulously designed an instrument to simulate specific incidents in the workplace that act as observable indicators of tacit knowledge, thus mitigating the problems of articulation, to a degree. Spender (1996) also views tacit knowledge as explicable or at least "not yet explicated" (pg 58).

Another important question relating to tacit knowledge is whether it is an individual characteristic or a combination of the individual and the collective. Nonaka & Takeuchi (1995) see it as a personal form of knowledge though they agree that groups may have some form of shared tacit knowledge. Choo (1998) also sees tacit knowledge as located in individuals as well as in groups. Sternberg (1985) did not specifically address this issue, but most of his research is focussed entirely at the individual level. Referring to Polanyi's (1966) description of how the "sensory quality" is attached to tacit knowledge, it would seem justifiable to assume that tacit knowledge is a characteristic of the individual, but that a collective dimension may be derived by a number of individuals.

There is a substantial amount of research into the nature of tacit knowledge in a variety of professions such as nursing (e.g. Eraut, 1994; Herbig et al., 2001; Benner & Tanner, 1987) and education (e.g. Nestor-Baker & Hoy, 2001; Almeida, 1994) and these studies provide a valuable insight into the working of tacit knowledge in these professions. There are also several studies of expertise in relation to tacit knowledge in various professional contexts (e.g. Cimino, 1999; Leithwood & Steinbach, 1995; Marchant & Robinson, 1999; Minstrell, 1999; Patel et al., 1999; Tan & Libby, 1997).

Sternberg and his associates' studies (e.g. Wagner & Sternberg, 1985; Wagner & Sternberg, 1986; Wagner & Sternberg, 1987; Sternberg & Wagner, 1993; Sternberg et al., 1993; Sternberg et al., 2000; Sternberg & Grigorenko, 2001a) in various professions are particularly noteworthy because they provide a comprehensive framework within which tacit knowledge can be studied, from a sound methodological viewpoint. Their work has resulted in the development of inventories specifically aimed at furthering our understanding of tacit knowledge within several professional groups.

Sternberg's (1985) conception of tacit knowledge exists as a construct and a measure of a form of intelligence he called practical intelligence. The idea of practical intelligence can be inferred from Neisser et al's (1996) definition of intelligence, as the ability to adapt effectively to the environment and to learn from experience. This definition reflects a practical perspective on intelligence that is similar to Sternberg's (1982) definition of intelligence, which he describes as an adaptive behaviour aimed at a certain objective.

Measurement of Tacit Knowledge

Despite a plethora of well documented accounts of why the management of knowledge at both the individual and organizational levels holds such value (Drucker, 1993; Quinn, 1992; Reich, 1991; Davenport & Prusak, 1998; Sternberg, et al., 1995; Abell, 2001), especially the importance attached to tacit knowledge for competitiveness and survival

(Baumard, 1999; Lubit, 2001; Choo, 1998; Grant 1996; Hall 1993; Prahalad & Hamel 1990), there have been a dearth of empirical studies to attempt to identify and measure it (Busch & Richards, 2000). The single most discerning factor onerous to operationalization of the construct "tacit knowledge" is the fact that tacit knowledge is not easily articulable (Morgan, 1986; Cooper & Sawaf, 1996; Forsythe et al. 1998). The degree to which tacit knowledge is measurable depends to a large extent on how one views its explicability. Some notable authors do view tacit knowledge as explicable, (e.g. Nonaka, 1994; Wagner & Sternberg, 1985; Collins, 2001; Janik, 1988) and whilst there may be difficulties, it therefore follows that it may be measurable. There is partial support for this view when one considers that some of the pioneers of the notion of tacit knowledge such as Polanyi (1966), Neisser (1976) and Schön (1983) did not describe it as being inarticulable, but instead suggested that it is 'difficult to articulate'.

Within the professions, several researchers have dedicated their efforts to the use of various elicitation techniques to develop standardized measures of tacit knowledge. These include the tacit knowledge measure for managers and executives (Wagner & Sternberg, 1985), school principals (Sternberg & Grigorenko, 2001a), military leadership (Forsythe et al., 1998; Horvath et al., 1999), salespersons (Wagner et al., 1999) and school superintendents (Nestor-Baker & Hoy, 2001). Other variant measures such as the situational judgment inventory (Motowidlo et al., 1990) and the crystallized measure of intelligence were also claimed to measure tacit knowledge. The construction of tacit knowledge assessments is laborious and complex (Horvath et al., 1999). The idea of an inventory is to produce a standard assessment tool to help researchers undertake further research on tacit knowledge without having to repeat the process of eliciting tacit knowledge over and over again.

Scepticisms, however, exist over the idea of measuring tacit knowledge. This is because it is widely understood that tacit knowledge is by nature, difficult to articulate. Tacit knowledge researchers do agree and acknowledged this fact. They also concur that direct inquisition of respondents on the perception they have of their tacit knowledge will not work (Forsythe, et al., 1998). Instead, special techniques and scrupulous designing of instruments become vital before any attempt is made to study tacit knowledge. Several methods have been proposed and used to elicit this "non-expressed phenomena". Among the methods that dominate the tacit knowledge literature are the sense-making technique, critical incident technique, situational judgment tests, and grammatical memorisation tasks.

Developed by Dervin (1983, 1992), the sense-making technique is an interview protocol that can be used "to encourage respondents to consider thoughts about their behaviour that may not be easily articulated but that the respondents employ to make sense of certain happenings" (Nestor-Baker & Hoy, 2001: pg. 94). It is claimed that the learning associated with tacit knowledge can be better accessed and probed using sense making (Cattell, 1971; Morgan, 1986), making the technique a useful qualitative method to elicit tacit knowledge. The critical incident technique was first introduced by Flanagan (1954) and it utilizes incidents that occur in the workplace to identify behaviours that contribute to the success or failure of individuals or organizations in specific situations. The technique is used primarily to study practical problems in several professions (Angelides, 2001). McClelland (1976) adapted this technique to assess managerial competence. Wagner & Sternberg (1985) used the critical incident technique to elicit tacit knowledge in their study on managers and academic psychologists. Nestor-Baker & Hoy (2001) combined the critical incident technique with sense-making methods in their study on school superintendents. The situational judgment test (SJT) is another instrument used to elicit tacit knowledge. It consists of a series of job-related situations presented in written, verbal, or visual form. It is commonly used for assessing interpersonal and problem-solving ability and respondent's behavioural intentions (Motowidlo et al., 1990; Chan & Schmitt, 1997; Weekley & Jones, 1997). A

significant problem associated with the use of SJTs, however, is that it is unclear what construct the test actually measures (Ployhart, 1999). Finally, the grammatical memorisation task is a technique used by Reber (1993) in the study of unconscious or implicit learning and its resultant product is tacit knowledge. Most of this research was within linguistic competence and uses grammatical memorisation tasks to elicit tacit knowledge (Reber 1993). Atherton (2002), however, argues that this method of understanding tacit knowledge is limited in its applicability, especially in real-world settings. He identifies the methodology used as constraining in terms of enabling the study of complex and coherent learning that takes place unconsciously in the professions.

Tacit Knowledge Inventory for Managers

Wagner & Sternberg (1985) developed the Tacit Knowledge Inventory for Managers (TKIM) by using the critical incident technique. They suggested that tacit knowledge has particular importance for managerial success and broke the term down into three categories:

1. Managing self: maximising self performance and productivity.
2. Managing others: working with, and directing others.
3. Managing career: establishing and enhancing self reputation.

These three categories became the core feature in the development of the Tacit Knowledge Inventory for Managers (TKIM) (Forsythe et al., 1998). It defines the scope of tacit knowledge based on the content of a situation. The scenarios depicted in the TKIM will elicit different responses from different individuals. Theoretically, experts are expected to respond differently than novices due to the content and organization of their tacit knowledge (Wagner et al., 1999). In previous studies, researchers have focussed on the differences in the response to the scenarios between novices and experts and correlated these differences with measures of job performance to determine whether or not significant relationships existed. This study will utilise the TKIM expert-novice difference score but will correlate it to aspects of individual differences in learning styles and learning strategies in an attempt to explain the variances in the two groups, and to establish the nature of the relationship necessary for success in managerial professions.

Relationship of Tacit Knowledge to Experience

A general consensus within the literature on tacit knowledge is to attribute its source to experience (Polanyi, 1966; Patel et al., 1999; Sternberg & Wagner, 1993; Baumard, 1999; Wagner, 1987; Nonaka, 1994; Forsythe et al., 1998). Hatsopoulos & Hatsopoulos (1999) refers to tacit knowledge as that which forms intuitions and instincts and derives from experience and analogical reasoning. When faced with the need to decide intuitively in new and unpredictable situations, making analogical inference to a known body of knowledge may help. For instance, a business manager may infer from his knowledge gained through training in engineering to help him make instinctive decisions. These authors also claim that "trial-and-error experiences have been the biggest source of tacit knowledge" (ibid, p. 150). Trial-and-error can have positive and negative consequences, and through successive experiences an individual's intuition can be finely tuned for a higher probability of success in future use. There is therefore strong evidence to suggest that the source of tacit knowledge derives from an individuals' personalized and practiced experience.

In Wagner & Sternberg's (1985) studies of the role of tacit knowledge in a group of business managers, academic psychologists and bank managers, it became apparent that there were significant variations in the level and content of tacit knowledge within the groups. These variations existed because different individuals go through their experiences differently, at different points in time and context. In Wagner *et al's* (1999) study of tacit knowledge in sales, it was also established that differences existed between the expert salespeople and novices. Many other studies have examined the differences in tacit knowledge either between successful and typical people (e.g. Nestor-Baker, 1999; Klemp & McClelland, 1986; Williams, 1991; Wagner & Sternberg, 1987) or between experts and novices (e.g. Patel et al., 1999; Tan & Libby, 1997; Murphy & Wright, 1984) and the majority have concluded that differences in tacit knowledge between the two groups existed. There was no attempt, however, to explore or provide an explanation for the reasons that account for these differences. It is clear from Wagner & Sternberg's (1985) observation that significant importance needs to be attached to understanding why these variations in both level and content of tacit knowledge occur:

> "Differences in tacit knowledge were consequential for career performance in professional and managerial career pursuits" (p.452).

Whilst there is a wealth of evidence confirming the role of experience as the major contributor or source of tacit knowledge (e.g. Sternberg & Wagner, 1993; Wagner, 1987), little has been done in the way of empirical studies to enhance our understanding of why these variations in level and content occur. There are indications, however, which suggest that the reason for these differences can be traced to several factors. Nonaka (1994), for example, explains that the generation and accumulation of tacit knowledge is determined by the 'variety' of an individual's experience and the individual's commitment and involvement in the 'context' of the situation (pp.21-22). This implies that the variety of a persons experiences and their motivation to engage in new experiences may account for some of these differences. It could be argued, however, that these are merely antecedents to the learning that is involved. For example, two managers may be equally motivated and experienced in their pursuit for career success. One, however, may be more successful than the other because he/she has attained a higher level of tacit knowledge necessary for success in the job context by being a more effective learner. Differences in the learning process, either explicitly or implicitly, may be a major source of differences in the level and content of tacit knowledge accumulated. Experience alone, it has been argued, is but one factor affecting the accumulation of tacit knowledge. A person's aptitude to learn is another major factor (Leithwood & Steinbach, 1995; Wagner & Sternberg 1987).

Different ways of Learning from Experience

Many authors have argued that the concept of tacit knowledge and the term "learning from experience" are inseparable (Patel et al., 1999; Baumard, 1999; Wagner & Sternberg, 1987; Wagner, 1987; Nonaka, 1994; Nonaka & Takeuchi, 1995; Neisser, 1996; Choo, 1998; Sternberg & Grigorenko, 2001a). The learning process has been highlighted as one important reason why some people are less adept at acquiring knowledge from experience than others and an important part of that process is the learning environment. Sternberg & Grigorenko, (2001a) have suggested that informal or implicit learning environments, compared with formal ones, do not adequately support the knowledge acquisition process for some individuals. Sternberg (1988) also alludes to this as he argues that formal learning

environments support knowledge acquisition by facilitating the process of selective encoding, selective combination and selective comparison, which are arguably essential features of the learning process for many people. Informal learning environments often fail to provide these features, and this may be one important factor accounting for the "explicit recognition of individual variation in the ability to learn from experience…" (Reuber et al, 1990, p.267). In addition to the context of the learning environment, individual differences in preferred ways of organizing and processing information and experience are also likely to have a profound effect on the acquisition of tacit knowledge.

In response to the important question posed by Colonia-Willner (1998) "…why do some experts (e.g., managers) learn more from their experience than others" (p.56), Hedlund *et al.,* (2001) looked into the process of tacit knowledge acquisition from the perspective of three interacting components: selective encoding, selective combination and selective comparison. This knowledge-acquisition model is derived from the componential sub-theory of Sternberg's (1985) triarchic theory of human intelligence. It is designed to enhance our understanding of the acquisition of all forms of knowledge and is not unique to tacit knowledge. In dealing with a situation, an individual will first identify and make sense of relevant information necessary for understanding the issue. Next, he/she needs to integrate all the relevant information into a comprehensive cognitive structure. The final step in this process is to relate and compare this newly formed information to relevant prior knowledge. Hedlund *et al*., (2001) contended that individuals differ in their ability to learn from experience by virtue of their ability to conform to the above processes in dealing with real-world, everyday, practical problems.

It is proposed here that within the knowledge-acquisition model described above, more prevalent elements affecting the variability in acquisition of tacit knowledge lie in an individuals' traits; their pre-established cognitive patterns that filter incoming information uniquely to an individual (Baumard, 1999). For example, the selective encoding and selective combination processes clearly involve the processing of information by an individual. It has been known for some time now that individuals differ in the way they perceive, conceptualise, organise and process information (Messick, 1976), and these differences depend on several attributes unique to the individual.

Adding to this line of argument, Sternberg *et al*, (2000) proposed a model of tacit knowledge involving the mental processes of encoding, storing and retrieving information from the memory. This model draws upon Tulving's (1972) work on the organization of memory in terms of episodic, semantic, and procedural memory. Procedural memory bears relevance to tacit knowledge because tacit knowledge is a subset of procedural knowledge. Figure 1 shows the three memories and the related paths of knowledge acquisition.

Tacit knowledge being acquired through personal experience and a subset of procedural knowledge will take the path of A1 or C1. This knowledge will likely confer its possessor a performance advantage since in its acquisition (that is not supported by direct instruction), "it is likely that some individuals will fail to acquire it" (p.117): thus explaining the differences in performance. The present authors contend that the reason why one individual might fail to acquire particular knowledge is due to the limitations of experiencing itself, and the fact that rarely do individuals go through entirely the same experience. Where individuals do go through very similar experiences, the issue is then not with some individuals failing to acquire the knowledge, but rather that individuals learn from their experiences in different ways leading to differences in the level and content of tacit knowledge. The proposed study is concerned with making a significant contribution here, adding to what is currently a very limited understanding of tacit knowledge acquisition (Hedlund et al., 2001; Wagner & Sternberg, 1985; Sternberg et al., 1993; Sternberg & Wagner, 1993).

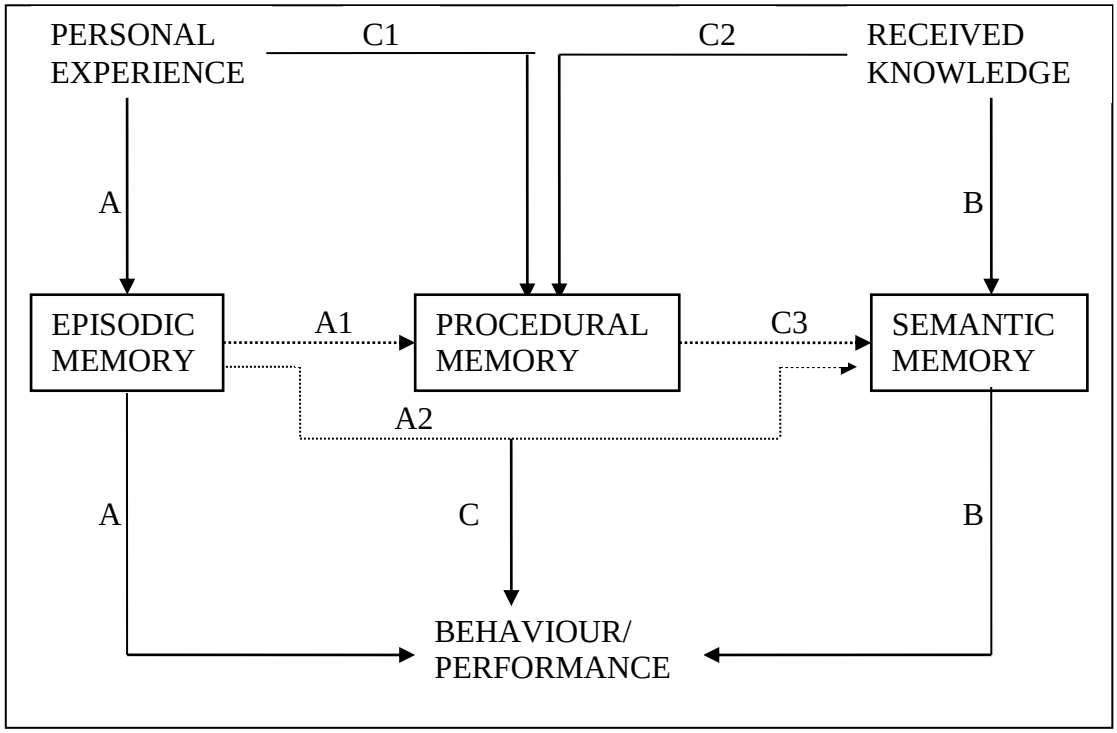

Figure 1: Memory structures and knowledge acquisition pathways in a cognitive model of tacit knowledge. (Source: Sternberg et al., 2000. Practical Intelligence in Everyday Life, p.114).

Recognizing the importance of differences in the level of tacit knowledge to career success, the study focuses on identifying causes for these differences, leading to the overarching research question of the study "What factors differentiate the way some individuals learn from experience compared with others?". The study adopts the common approach of using the successful-typical perspective to focus on differences between groups as well as differences within groups. A major deviation from previous research in the field, however, is that the current study is aimed at searching for the cause of differences in the content of tacit knowledge, rather than merely predicting performance.

The authors believe that investigating the relationship between the different ways people learn from their experiences, and how this impacts on variations in the level of their accumulated tacit knowledge will make a significant contribution to the field.

Individual Differences in Learning Outcome

Referring once again to Sternberg & Wagner's (1986) claim that tacit knowledge is a product of learning that affects performance in real-world settings, tacit knowledge can therefore be conceived of as a learning outcome. A range of individual differences can impact on learning outcomes such as intelligence, cognitive controls, cognitive styles, learning styles, personality, and prior knowledge (Jonassen & Grabowski, 1993). Intelligence, cognitive controls and cognitive styles are believed to be stable individual traits that would not lend themselves easily to developmental opportunities. Consequently, their utility as a management development initiative is rather limited, despite being widely recognised as highly significant in understanding human characteristics. Furthermore, it can be argued that

certain measures of mental ability (those involving crystallized intelligence tests, such as the Vocabulary and Comprehension subtests of the WISC, WAIS, and Stanford Binet IQ tests), despite also being claimed to measure tacit knowledge (Gottfredson, in press), were perceived as rather intrusive when used in managerial settings with experienced managers. This makes mental ability tests a less viable option when compared with tests using job related scenarios such as those used in tacit knowledge inventories.

Personality measures are also viewed as problematic in dealing with tacit knowledge. Tests conducted by Wagner and Sternberg (1990) involving tacit knowledge revealed near non-significant correlations with personality measures. One reason for this may be due to the scale of constructs covered by personality measures. As Jonassen & Grabowski (1993) point out:

> "Personality is perhaps the broadest dimension of individual differences, subsuming to a large degree, most of the other dimensions" (p.303).

One example of this claim can be found in Miller's (1988) model of personality which comprises three domains: cognitive, affective and conative. Jonassen & Grabowski (1993) point out that the cognitive domain of Miller's model consists of an analytic-holistic dimension: the underlying principle of many cognitive styles. Furnham *et al.*, (1999) also draws his reader's attention to previous research that found considerable inter-correlation between personality variables and learning styles and concluded that learning styles are a subset of personality.

Tacit knowledge, being closely associated with personal experience, will depend on the nature of the individual for its acquisition and this will depend to a great extent on a person's preferred way of learning. This is because, people will usually learn, especially without formal instruction, in their preferred mode of learning. A person's preferred way of learning is usually contained in the notion of style. It follows, therefore, that differences in tacit knowledge among individuals can perhaps be understood by considering the learning style construct. This view is supported by Sternberg & Grigorenko (2001b) who acknowledged that learning styles lie "…at the interface between abilities, on the one hand, and personality, on the other" (p.2).

The preceding discussions lead to the proposition that differences in learning style will result in differences in learning outcome, and consequently on the level and content of accumulated tacit knowledge.

Theoretical Models of Experiential Learning

Learning from experience has become a focal point of many theorists and researchers. Experiential learning as a discipline attracts interest in wide-ranging fields from farming to workplace training and development. Within experiential learning, learning is described as a process by which a learner reflects upon his or her experience resulting in new insights. One notable researcher in the field of learning and learning styles is David Kolb who developed the Experiential Learning Theory (ELT) that turned out to be one of the most developed and well-researched models of experiential learning (Kolb, 1984). In this theory, experiential learning is defined as:

> "…the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984; p.41).

From the experiential learning perspective, there is the assumption that experience needs to be acted upon in order to be learned. Wight (1970) cited in Ekpenyong, (1999) suggests that people seldom learn from their experience unless the experience is examined as a means of providing meaning as he or she sees it. Through the process of examination, understanding, insights and discoveries are made to add value to the experience as well as other prior experiences. This is then integrated into the person's "system of constructs which he/she imposes on the world, through which he/she views, perceives, categorises, evaluates and seeks experience" (pp.234-282).

Kolb's four stage model of learning from experience is based on such a process (Figure 2) and focuses on the polar extremes of concrete-abstract and active-reflective dimensions of cognitive growth. The concrete-abstract dimension represents how one prefers to perceive the environment or grasp experiences in the world. The active-reflective dimension represents how one prefers to process or transform incoming information (Kolb, 1984). The model represents a four-stage cycle of learning from concrete experience (CS) leading to reflective observation (RO) on that experience followed by the development of theory through abstract conceptualisation (AC). The theory is then tested through active experimentation (AE) which leads to new concrete experiences, and so the cycle continues. Kolb (1984) also suggested that individuals are likely to have particular preferences for engaging with each of these four learning modes. For example, the more abstract individuals will comprehend information conceptually and symbolically, whereas concrete individuals will rely more on immediate and felt experiences. Active individuals will be more inclined to manipulate the external environment, whereas reflective individuals will be more inclined to engage in internal reflection of the real world.

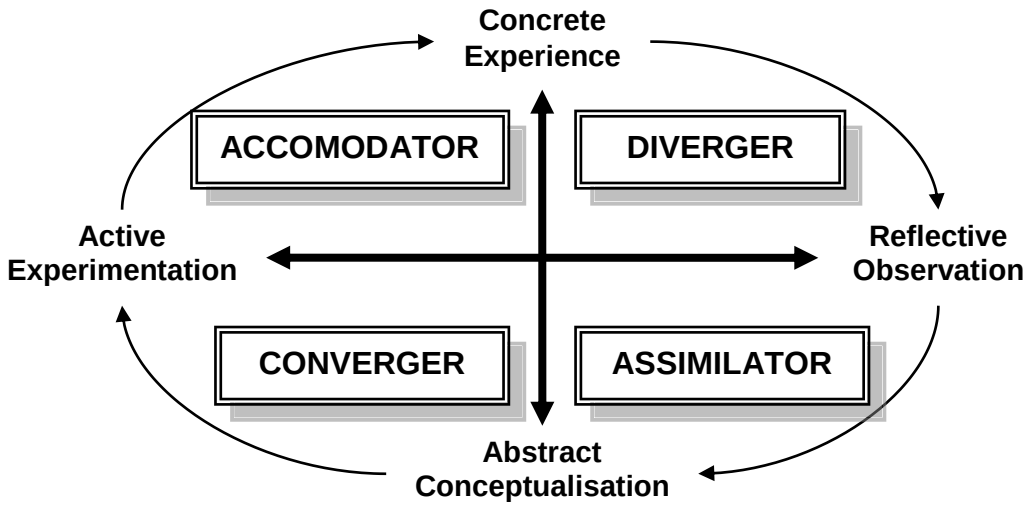

Figure 2: Kolb's Learning Styles (Adapted from Kolb et al., 1999).

Possession of all four different abilities indicated by the four poles of the model was argued by Kolb & Fry (1975) to be critical for effective learning from experience. Not everyone, however, has the ability to be strong in all four modes and, in fact, most people

tend to develop particular strengths in one or two of these. This led to the development of learning styles to explain these phenomena. The two distinct dimensions of Concrete Experience-Abstract Conceptualisation and Reflective Observation-Active Experimentation are orthogonal and form four quadrants that lead to different learning styles (Kolb, 1984). Divergers combine learning steps of concrete experience (CE) and reflective observation (RO). Assimilators combine the steps of reflective observation (RO) and abstract conceptualisation (AC). Convergers combine the steps of abstract conceptualisation (AC) and active experimentation (AC). Accommodators combine the learning steps of active experimentation (AC) and concrete experience (CE).

Kolb (1984) developed a measure of learning style called the Learning Styles Inventory (LSI) which consists of learning situations that are presented in twelve statements. The inventory is a self descriptive questionnaire and respondents are forced to rank-order four sentence endings that correspond to the four learning styles. Kolb *et al.,* (1999) describe the development of the Learning Styles Inventory (LSI) and draw our attention to the fact that it was first developed in 1971, and first published in 1976. The major criticism of this inventory at that time was with the internal consistency of the scales, and the scales test-retest reliability. These criticisms led to the development of the second version of LSI, the LSI-II (Smith & Kolb, 1986). Internal consistency of the scales were reported to have been improved, but critics continued to report problems with test-retest reliability. The most recent version, the LSI-III, was released in 1999 and it was stated that "randomizing the order of the LSI-II items have resulted in dramatic improvements in its test-retest reliability" (Kolb et al., 1999; p.6).

According to Kolb and Fry (1975) cited in Jonassen & Grabowski (1993) differences in learning style are the result of heredity, socialisation, past experiences and the demands of the present environment. Style is believed to constitute a preference to do things, irrespective of a person's ability to do it (Zhang, 2001) and is believed to be habitual and "consistent over long periods of time and across many areas of activity" (Sternberg & Grigorenko, 2001a, p.2). There have been many studies which have explored the role of learning style in affecting learning outcomes (Zhang, 2001) but Sternberg & Grigorenko (2001a) became particularly interested in the notion of styles in relation to the acquisition of tacit knowledge as an attempt to fill the gap left by conventional ability tests in accounting for people's differences in performance.

Design of Proposed Study

According to Kolb (1984), learning is concerned with the production of knowledge, a view that is endorsed by Jarvis (1987) who believes that Kolb has successfully demonstrated an intimate relationship between the two terms. Smith (2001), however, insists that the relationship between learning and knowledge is problematic. He pointed out that although there is a discussion of the structure of knowledge in Chapter Five of his book "Experiential Learning" (Kolb, 1984), Kolb does not explore the nature of knowledge in sufficient detail.

This paper has considered the literature on knowledge in some depth and has developed an argument which suggests that tacit knowledge, as opposed to explicit knowledge, is an important product of experiential learning. It has also been argued that among those who engage in similar experiences, variations are known to exist both within and between groups of managers in terms of the content and level of accumulated tacit knowledge. It is suggested that there are two possible reasons for this. First of all, tacit knowledge is likely to be context-dependent (Sternberg & Grigorenko, 2001a; Choo, 1998) which means that within the professions, an individual's work environment may have a

significant influence on accumulated tacit knowledge. There have been attempts to address this issue by adding the context of a situation to the scope of tacit knowledge under investigation (Wagner, 1987) but results have not been conclusive. Secondly, the idea that people tend to adopt a particular style when learning from experience has also been discussed and it has been suggested that the effectiveness with which people learn will depend ultimately on the particular learning style adopted. An important area of investigation that has not been pursued, is whether the degree to which an individual's dominant preferred learning style is matched with the context of their work environment will impinge on the level of tacit knowledge acquired by managers. This is the primary purpose of the proposed investigation being discussed in this paper.

Methodology

Research traditions within management and its sub-specialisms, such as management learning and development, do not escape from the fundamental debate between positivism and phenomenology (Easterby-Smith & Thorpe, 1997). However, an increasing number of researchers are becoming aware of the fact that it is unlikely for any one of the two paradigms to claim dominance because each has its own strengths and limitations. McGrath et al (1982) and Morgan (1998) propose the integration of both approaches in a way that leads to the weakness of one method being compensated for by the strength of the other. In view of the complexity of tacit knowledge as a phenomenon, the present authors have concluded that this research will benefit from the use of a mixed-method approach (Clarke & Yaros, 1988).

Quantitative approach

The quantitative component of the study will involve the use of a questionnaire incorporating both the LSI-III Learning Styles Inventory (Kolb, 1999) and the TKIM Tacit Knowledge Inventory for Managers (Wagner & Sternberg, 1985). The TKIM, developed using the critical incident technique, is based on the theoretical expectation that experts are expected to respond differently to novices due to the content and organisation of their tacit knowledge (Wagner et al, 1999). The present study is concerned with establishing whether or not differences between expert and novice groups are affected by individual learning styles. Reliability measures for the TKIM were provided by several studies with Cronbach's alpha coefficient ranging from a low of 0.68 (Wagner & Sternberg, 1985) to a high of 0.85 (Colonia-Willner, 1998). Sternberg et al (2000) discusses a range of studies that demonstrate significant evidence of validity for the TKIM in tests with managers.

The LSI-III is based on an ipsative scale (Geiger *et al.*, 1993) because the LSI was originally intended to measure an individual's preference in learning, rather than ability to learn. However, criticisms of some of the previous studies using the LSI have been levelled at the deficiency and limitations of ipsative measures because they produce nominal data which should not be correlated with normative data as many previous studies have done (Higgs, 2001). Attempts to create and study a normative form of the LSI were first undertaken by Romero *et al*. (1992) and Geiger *et al*. (1993). Geiger *et al*. (1993) converted the 12 items (with 4 endings) on the LSI into an independent, randomly ordered 48 item questionnaire. Each item was scored on a 7-point Likert scale of "*not like me - very much like me"*. Statistical procedures used to compare the ipsative and normative forms of the LSI revealed strong support for the same learning style preferences theorised by Kolb in both measures. Consistent and strong reliabilities for the randomized normative version were also noted. Due to the nature of the present study, a normative version of the LSI will be adopted.

Qualitative approach

For the qualitative component, an in-depth interview protocol based on the Sense-Making Technique will be used to investigate whether managers consciously realize the role of experience in helping them tackle practical problems on a daily basis and whether they make a conscious effort to learn from those experiences.

Sample

Since the research is concerned with our earlier claims that most learning done by managers about managing does not come from organized learning providers and formal learning programmes (Mumford, 1997; Burgoyne & Hodgson, 1983), the research will be based within a training institution which exists exclusively for the development of practicing managers in the public sector. Respondents will be participants attending courses within this institution who represent the population of managers in the nation's (Malaysia) public sector. It is anticipated that approximately 400 managers will participate in the quantitative element of the study, and approximately 20 in-depth interviews will be conducted to form the qualitative element of the study.

Conclusion

It is clear that formal methods of education represent only a small part of the management learning process. Some have even argued that institutionalised learning is almost irrelevant compared to informal learning (Dawes *et al*, 1996). Others, however, have suggested that informal learning needs to be compared and contrasted with formal learning as a way increasing our understanding of the endemic problems associated with the latter (Lave & Wenger, 1991). Strong theoretical and empirically based research has demonstrated that most effective learning occurs in the workplace in tacit, culturally embedded ways through normal work practices within organisations or other communities of practice (Fox, 1997). Managers themselves often associate their own significant learning with informal, rather than formal experiences (Mumford, 1993). It follows, therefore, that there needs to be a shift of emphasis in traditional training and development away from the provision and delivery of knowledge towards a more facilitative approach where management learning can occur more effectively through informal, and perhaps on-the-job methods. This will allow organisations and management trainers to become more successful in their quest for managerial effectiveness.

Terms associated with on-the-job or informal learning include 'implicit or unconscious learning' (Reber, 1967), 'situated learning' (Lave & Wenger, 1991), and 'experiential learning' (Kolb, 1984). There is common agreement that these forms of learning lead to the accumulation of tacit knowledge (Nonaka & Takeuchi, 1995; Choo, 1998) which is closely associated with experts and successful people (Nestor-Baker & Hoy, 2001; Wagner & Sternberg, 1985). But despite a plethora of well documented accounts of why tacit knowledge holds such value for both individuals and organisations alike (Davenport & Prusak, 1998; Sternberg, et al., 1995; Baumard, 1999) there have been a dearth of empirical studies to attempt to identify and measure the construct (Busch & Richards, 2000). Some would argue that this is because tacit knowledge is not easily articulated (Schon, 1983; Forsythe *et al,* 1998). Accepting the difficulties associated with its articulation (Spender, 1996; Stenberg, 1985) some leading researchers have continued in their attempts to design

and validate psychometric instruments that are purported to measure the construct (Dervin, 1992; McClelland, 1986; Wagner & Sternberg, 1985). Research using these instruments has led to the major finding that significant variations exist in the level and content of tacit knowledge within equivalent groups (Wager & Sternberg, 1985). This is thought to be due to variations in the way individuals pass through their experiences at different points in time and context (Wagner *et al*, 1999). There have been no attempts, however, to explore or provide an explanation for the precise reasons that account for these differences. The present authors have developed an argument to suggest that whilst a person's aptitude to learn may be one major factor accounting for these differences (Leithwood & Steinbach, 1995; Wagner & Sternberg 1987), learning styles may be another. This is because individuals who go through very similar experiences may learn from those experiences in entirely different ways, leading to differences in acquired knowledge.

The intended contributions of the study described are twofold. Firstly, it will seek to enhance our understanding of the significance of learning styles in the acquisition of tacit knowledge, particularly in relation to the work context. Secondly, it will inform management trainers of ways in which they need to shift their role from knowledge providers to facilitators of management learning. The ultimate objective is to provide an overall improvement in the effectiveness of management learning.

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